

# Marine Biology

International Journal on Life in Oceans and Coastal Waters

Volume 106, 1990

---

**Editor in Chief**

**O. Kinne** Ecology Institute, Nordbunte 23, 2124 Oldendorf/Luhe,  
Federal Republic of Germany, FAX (0) 41 32/88 83

**Editors**

**M. Anraku**  
Overseas Fishery Cooperation Foundation  
Suva Office, Private Mail Bag  
Suva, Fiji

**T. M. Fenchel**  
Marine Biological Laboratory  
University of Copenhagen  
DK-3000 Helsingør, Denmark

**J. P. Grassle**  
Institute of Marine and Coastal Sciences  
Rutgers University/Cook College  
Old Blake Hall  
P.O. Box 231  
New Brunswick, New Jersey 08903, USA

**M. G. Hadfield**  
Kewalo Marine Laboratory  
University of Hawaii  
41 Ahui Street  
Honolulu, Hawaii 96813, USA

**G. F. Humphrey**  
Building A 12  
University of Sydney  
Sydney, NSW 2006, Australia

**O. Kinne**  
Ecology Institute  
Nordbunte 23  
2124 Oldendorf/Luhe  
Federal Republic of Germany

**J. M. Lawrence**  
Department of Biology  
University of South Florida  
Tampa, Florida 33620, USA

**J. Mauchline**  
Scottish Marine Biological Association  
Dunstaffnage Marine Research Laboratory  
P.O. Box 3  
Oban PA34 4AD, Argyll, Scotland

**R. O'Dor**  
Department of Biology  
Dalhousie University  
Halifax, Nova Scotia B3H 4J1,  
Canada

**J. M. Pérès**  
Station Marine d'Endoume  
et Centre d'Océanographie  
Rue de la Batterie-des-Lions  
Marseille (7e), France

**M. Sara**  
Istituto di Zoologia  
Università di Genova  
Via Balbi 5, 16126 Genova, Italy

**M. E. Vinogradov**  
P. P. Shirshov Institute of Oceanology  
USSR Academy of Sciences  
23 Krasikova  
Moscow 117218, USSR

**Assistants to the Editors**

**R. Friedrich, S. L. Matthews**  
Ecology Institute, Nordbunte 23, 2124 Oldendorf/Luhe,  
Federal Republic of Germany



Springer International

---

## Copyright

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e.g., as offprints), as well as all transla-

tion rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

*Special regulations for photocopies in the USA:* Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US \$ 0.20 per page, or a minimum of US \$ 1.00 if an article contains fewer than five pages. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0025-3162, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

# Contents

- Agnisola C → Houlihan DF
- Barker KM, Chapman ARO: Feeding preferences of periwinkles among four species of *Fucus* 113
- Barnet EA → Beaumont AR
- Bartels-Hardege HD, Zeeck E: Reproductive behaviour of *Nereis diversicolor* (Annelida: Polychaeta) 409
- Beaumont AR, Beveridge CM, Barnet EA, Budd MD: Genetic studies of laboratory-reared *Mytilus edulis*. III. Scored loci act as markers for genotype-specific mortalities which are unrelated to temperature 227
- Beiras R → Ferreira MJ
- Beveridge CM → Beaumont AR
- Biddanda B → González H
- Bjerregaard P: Influence of physiological condition on cadmium transport from haemolymph to hepatopancreas in *Carcinus maenas* 199
- Böttger-Schnack R: Community structure and vertical distribution of cyclopoid copepods in the Red Sea. I. Central Red Sea, autumn 1980 473
- Böttger-Schnack R: Community structure and vertical distribution of cyclopoid copepods in the Red Sea. II. Aspects of seasonal and regional differences 487
- Bonar DB → Coon SL
- Bonar DB → Fitt WK
- Boudreau B, Bourget E, Simard Y: Benthic invertebrate larval response to substrate characteristics at settlement: shelter preferences of the American lobster *Homarus americanus* 191
- Bourget E, Brock V: Short-term shell growth in bivalves: individual, regional, and age-related variations in the rhythm of deposition of *Cerastoderma (= Cardium) edule* 103
- Bourget E → Boudreau B
- Bourne N → Whyte JNC
- Brey T: Confidence limits for secondary production estimates: application of the bootstrap to the increment summation method 503
- Brock V → Bourget E
- Budd MD → Beaumont AR
- Carey FG, Scharold JV: Movements of blue sharks (*Prionace glauca*) in depth and course 329
- Chamroux S → Prieur D
- Chapman ARO → Barker KM
- Chisholm LA, Roff JC: Size-weight relationships and biomass of tropical neritic copepods off Kingston, Jamaica 71
- Chisholm LA, Roff JC: Abundances, growth rates, and production of tropical neritic copepods off Kingston, Jamaica 79
- Cimino G → García-Gómez JC
- Cockcroft AC → Du Preez HH
- Colwell RR → Fitt WK
- Coon SL → Fitt WK
- Coon SL, Fitt WK, Bonar DB: Competence and delay of metamorphosis in the Pacific oyster *Crassostrea gigas* 379
- Danulat E → Walsh PJ
- Davison IR → Dudgeon SR
- Delivopoulos SG, Diannelidis BE: Ultrastructure of carposporophyte development in the red alga *Caulacanthus ustulatus* (Gigartinales: Caulacanthaceae) 145
- Dennison WC → Williams SL
- Diannelidis BE → Delivopoulos SG
- Donnelly J, Torres JJ, Hopkins TL, Lancraft TM: Proximate composition of Antarctic mesopelagic fishes 13
- Dudgeon SR, Davison IR, Vadas RL: Freezing tolerance in the intertidal red algae *Chondrus crispus* and *Mastocarpus stellatus*: relative importance of acclimation and adaptation 427
- Dunton KH: Growth and production in *Laminaria solidungula*: relation to continuous underwater light levels in the Alaskan High Arctic 297
- Du Preez HH, McLachlan A, Marais JFK, Cockcroft AC: Bioenergetics of fishes in a high-energy surf-zone 1
- Durand P → Prieur D
- Erauso G → Prieur D
- Fera Ph → Prieur D
- Fernández-Reiriz MJ → Ferreira MJ
- Ferreiro MJ, Pérez-Camacho A, Labarta U, Beiras R, Planas M, Fernández-Reiriz MJ: Changes in the biochemical composition of *Ostrea edulis* larvae fed on different food regimes 395
- Fitt WK → Coon SL
- Fitt WK, Coon SL, Walch M, Weiner RM, Colwell RR, Bonar DB: Settlement behavior and metamorphosis of oyster larvae (*Crassostrea gigas*) in response to bacterial supernatants 389
- Foti L → Houlihan DF
- Fukuhara O: Effects of temperature on yolk utilization, initial growth, and behaviour of unfed marine fish-larvae 169
- García-Gómez JC, Cimino G, Medina A: Studies on the defensive behaviour of *Hypselerodoris* species (Gastropoda: Nudibranchia): ultrastructure and chemical analysis of mantle dermal formations (MDFs) 245
- García-Martin LO → Rodríguez JL
- Gibbs A, Somero GN: Na<sup>+</sup>-K<sup>+</sup>-adenosine triphosphatase activities in gills of marine teleost fishes: changes with depth, size and locomotory activity level 315
- Ginter NG → Whyte JNC
- González H, Biddanda B: Microbial transformation of metazoan (*Idotea granulosa*) faeces 285
- Gordon DM, Sand-Jensen K: Effects of O<sub>2</sub>, pH and DIC on photosynthetic net-O<sub>2</sub> evolution by marine macroalgae 445
- Grémare A: Consumption of diatoms and diatom filtrates by the tentaculate deposit-feeder *Eupolyommia nebulosa* (Annelida: Polychaeta) 139
- Grémare A → Marsh AG
- Hall JA, Vincent WF: Vertical and horizontal structure in the picoplankton communities of a coastal upwelling system 465
- Hamner WM → Strand SW
- Handa N → Sakugawa H
- Harvey HR → Marsh AG
- Henry RP → Walsh PJ
- Herring PJ: Bioluminescent responses of the deep-sea scyphozoan *Atolla wyvillei* 413
- Hirche H-J: Egg production of *Calanus finmarchicus* at low temperature 53
- Hopkins TL → Donnelly J
- Houlihan DF, McMillan DN, Agnisola C, Trara Genoino I, Foti L: Protein synthesis and growth in *Octopus vulgaris* 251
- Jamieson BGM, Tudge CC: Doripids are Heterotremata: evidence from ultrastructure of the spermatozoa of *Neodorippe astuta* (Dorippidae) and *Portunus pelagicus* (Portunidae) Brachyura: Decapoda 347
- Jeanthon C → Prieur D
- Jones DA → Kurlaly K
- Kellermann A: Food and feeding dynamics of the larval Antarctic fish *Nototheniops larseni* 159
- Krüger R → Röttger R
- Kurlaly K, Jones DA, Yule AB: Acceptability and digestion of diets fed to larval stages of *Homarus gammarus* and the role of dietary conditioning behaviour 181
- Labarta U → Ferreira MJ
- Lancraft TM → Donnelly J
- Le Borgne L → Prieur D
- Lee SY: Primary productivity and particulate organic matter flow in an estuarine mangrove-wetland in Hong Kong 453
- Lewis JB, Snelgrove PVR: Corallum morphology and composition of crustacean cryptofauna of the hermatypic coral *Madracis mirabilis* 267
- Loneragan NR, Potter IC: Factors influencing community structure and distribution of different life-cycle categories of fishes in shallow waters of a large Australian estuary 25
- Manahan DT → Shilling FM
- Marais JFK → Du Preez HH

- Marsh AG, Harvey HR, Grémare A, Tenore KR: Dietary effects on oocyte yolk-composition in *Capitella* sp. I (Annelida: Polychaeta): fatty acids and sterols 369
- Martínez-Expósito MJ → Méndez J
- McLachlan A → Du Preez HH
- McManus JW, Pauly D: Measuring ecological stress: variations on a theme by R.M. Warwick 305
- McMillan DN → Houlihan DF
- Medina A → García-Gómez JC
- Méndez J, Pasantes JJ, Martínez-Expósito MJ: Banding pattern of mussel (*Mytilus galloprovincialis*) chromosomes induced by 2 × SSC/Giemsa-stain treatment 375
- Mével G → Prieur D
- Miller CB, Nelson DM, Weiss C, Soeldner AH: Morphogenesis of opal teeth in calanoid copepods 91
- Mommsen TP → Walsh PJ
- Nelson DM → Miller CB
- Novak R → Schiemer F
- Oeschger R, Storey KB: Regulation of glycolytic enzymes in the marine invertebrate *Halicryptus spinulosus* (Priapulida) during environmental anoxia and exposure to hydrogen sulfide 261
- Olivar MP: Spatial patterns of ichthyoplankton distribution in relation to hydrographic features in the Northern Benguela region 39
- Ott J → Schiemer F
- Pasantes JJ → Méndez J
- Pauly D → McManus JW
- Pérez-Camacho A → Ferreiro MJ
- Pérez-Camacho A → Rodríguez JL
- Planas M → Ferreiro MJ
- Potter IC → Loneragan NR
- Prieur D, Chamroux S, Durand P, Erauso G, Fera Ph, Jeanthon C, Le Borgne L, Mével G, Vincent P: Metabolic diversity in epibiotic microflora associated with the Pompeii worms *Alvinella pompejana* and *A. caudata* (Polychaeta: Annelida) from deep-sea hydrothermal vents 361
- Ramos-Martínez JJ → Villamarín JA
- Rodríguez JL, Sedano FJ, García-Martín LO, Pérez-Camacho A, Sánchez JL: Energy metabolism of newly settled *Ostrea edulis* spat during metamorphosis 109
- Röttger R, Krüger R: Observations on the biology of Calcarinidae (Foraminifera) 419
- Roff JC → Chisholm LA
- Sabapathy U → Teo LH
- Sakugawa H, Handa N, Yagi K: Distribution of glycosylglycerols and oligosaccharides in the marine environment and their ecological significance in the deep sea 309
- Sánchez JL → Rodríguez JL
- Sand-Jensen K → Gordon DM
- Scharold JV → Carey FG
- Scheffel-Möser U → Weisse T
- Schiemer F, Novak R, Ott J: Metabolic studies on thiotrophic free-living nematodes and their symbiotic microorganisms 129
- Schneider G: A comparison of carbon based ammonia excretion rates between gelatinous and non-gelatinous zooplankton: implications and consequences 219
- Sedano FJ → Rodríguez JL
- Shilling FM, Manahan DT: Energetics of early development for the sea urchins *Strongylocentrotus purpuratus* and *Lytechinus pictus* and the crustacean *Artemia* sp. 119
- Simard Y → Boudreau B
- Smith SL: Egg production and feeding by copepods prior to the spring bloom of phytoplankton in Fram Strait, Greenland Sea 59
- Snelgrove PVR → Lewis JB
- Soeldner AH → Miller CB
- Somero GN → Gibbs A
- Spindler K-D → Spindler-Barth M
- Spindler-Barth M, Wormhoudt A Van, Spindler K-D: Chitinolytic enzymes in the integument and midgut-gland of the shrimp *Palaemon serratus* during the moulting cycle 49
- Stimson J: Stimulation of fat-body production in the polyps of the coral *Pocillopora damicornis* by the presence of mutualistic crabs of the genus *Trapezia* 211
- Storey KB → Oeschger R
- Strand SW, Hamner WM: Schooling behavior of Antarctic krill (*Euphausia superba*) in laboratory aquaria: reactions to chemical and visual stimuli 355
- Tenore KR → Marsh AG
- Teo LH, Sabapathy U: Preliminary report on the digestive enzymes present in the digestive gland of *Perna viridis* 403
- Torres JJ → Donnelly J
- Trara Genoino I → Houlihan DF
- Tudge CC → Jamieson BGM
- Vadas RL → Dudgeon SR
- Vetter RD → Wilmot DB Jr
- Villamarín JA, Ramos-Martínez JJ: Effect of fructose 2,6-bisphosphate and ammonium ions on AMP-mediated activation of phosphofructokinase from the posterior adductor muscle of the sea mussel *Mytilus galloprovincialis* 235
- Vincent P → Prieur D
- Vincent WF → Hall JA
- Walch M → Fitt WK
- Walsh PJ, Henry RP: Activities of metabolic enzymes in the deep-water crabs *Chaceon fenneri* and *C. quinque-dens* and the shallow-water crab *Callinectes sapidus* 343
- Walsh PJ, Danulat E, Mommsen TP: Variation in urea excretion in the gulf toadfish *Opsanus beta* 323
- Weiner RM → Fitt WK
- Weiss C → Miller CB
- Weisse T, Scheffel-Möser U: Growth and grazing loss rates in single-celled *Phaeocystis* sp. (Prymnesiophyceae) 153
- Westin L: Orientation mechanisms in migrating European silver eel (*Anguilla anguilla*): temperature and olfaction 175
- Whyte JNC, Bourne N, Ginther NG: Biochemical and energy changes during embryogenesis in the rock scallop *Cras-sadoma gigantea* 239
- Williams SL, Dennison WC: Light availability and diurnal growth of a green macroalga (*Caulerpa cupressoides*) and a seagrass (*Halophila decipiens*) 437
- Wilmot DB Jr, Vetter RD: The bacterial symbiont from the hydrothermal vent tubeworm *Riftia pachyptila* is a sulfide specialist 273
- Wormhoudt A Van → Spindler-Barth M
- Yagi K → Sakugawa H
- Yule AB → Kurnaly K
- Zeeck E → Bartels-Hardege HD
- Indexed in Current Contents

